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2012–2013 Minerals Yearbook

SOUTH DAKOTA [ADVANCE RELEASE]

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U.S. Geological Survey

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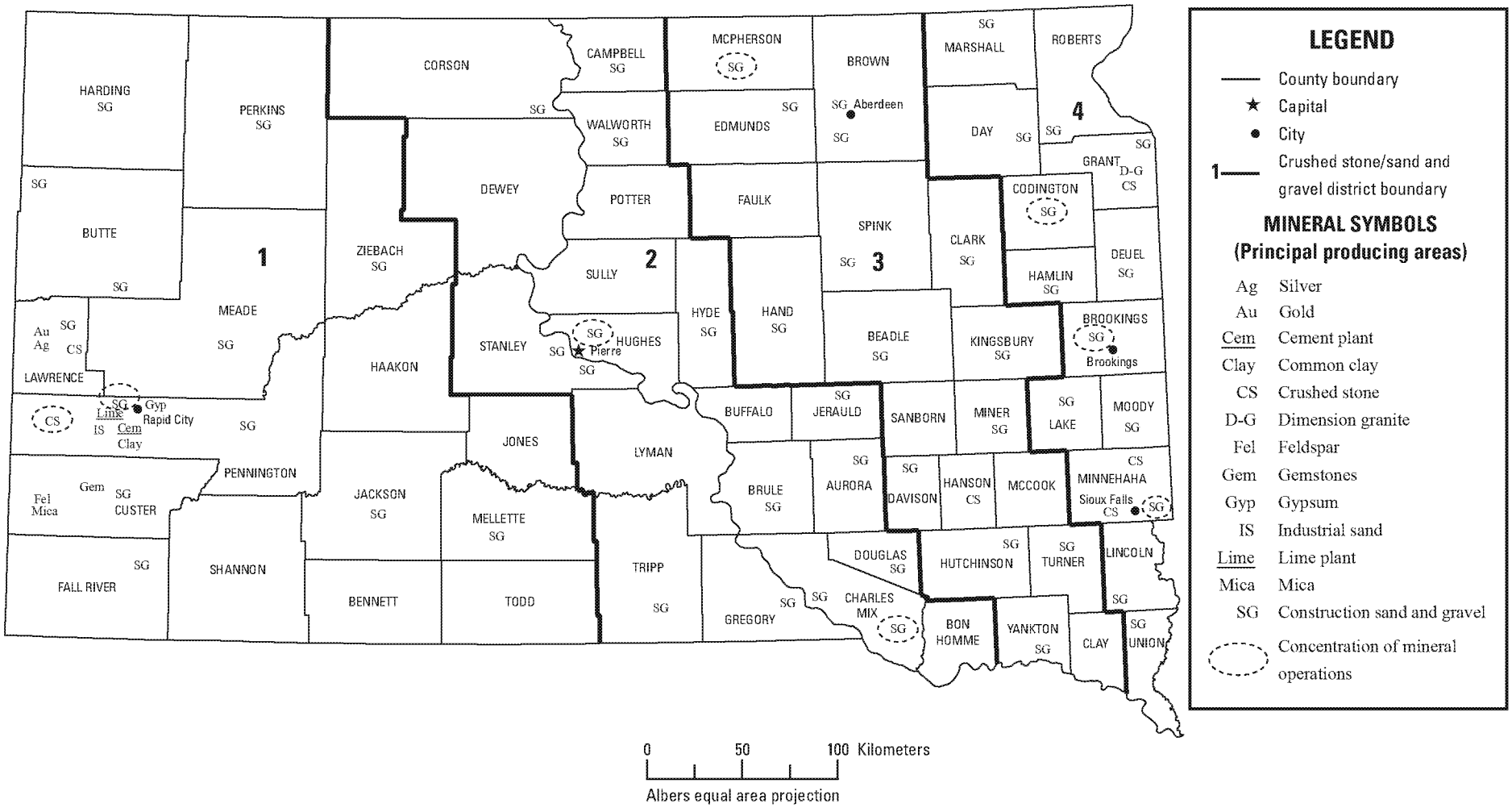
SOUTH DAKOTA



LEGEND

- County boundary
- ★ Capital
- ● City
- 1 Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS
(Principal producing areas)

Ag	Silver
Au	Gold
Cem	Cement plant
Clay	Common clay
CS	Crushed stone
D-G	Dimension granite
Fel	Feldspar
Gem	Gemstones
Gyp	Gypsum
IS	Industrial sand
Lime	Lime plant
Mica	Mica
SG	Construction sand and gravel

Concentration of mineral operations

Source: South Dakota Geological Survey/U.S. Geological Survey (2012–13).

The Mineral Industry of South Dakota

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the South Dakota Geological Survey for collecting information on all nonfuel minerals.

In 2013, the value of the nonfuel mineral production[1] in the State of South Dakota decreased to $325 million, 0.4% of the total U.S. nonfuel mineral production, ranking it 38th in the Nation. In 2012, the corresponding value was $342 million, 0.45% of the U.S. total nonfuel mineral production, ranking it 35th among the 50 States. In 2013, on a per capita basis, nonfuel mineral production in South Dakota had a value of $385 compared with the national average of $238. In 2012, the per capita value was $404 compared with the national average of $241.

The value of nonfuel mineral production in South Dakota for the years 2006 through 2013 was as follows (in millions of dollars): $232 (2006), $263(2007), $247 (2008), $233 (2009), $267 (2010), $311 (2011), $342 (2012), and $325 (2013).

In 2013, there were 744 employees in nonfuel mineral mines in South Dakota and 258 in mills and preparation plants. In 2012, the corresponding numbers were 782 in nonfuel mineral mines and 247 in mills and preparation plants (U.S. Mine Safety and Health Administration, 2013, p. 15; 2014, p. 15). In 2013, the average annual wage in South Dakota for all mining was $54,103 compared with $37,086 for all industries. In 2012, the corresponding figures were $53,391 and $36,305, respectively (National Mining Association, unpub. data, February 4, 2016).

In 2013, on the basis of production value, construction sand and gravel was the leading nonfuel mineral commodity in South Dakota, having increased 33% in production quantity and 28% in production value compared with 2012. Crushed stone was the second leading publishable commodity and increased 14% in quantity and 19% in production value from 2012. However, in 2013, the production value for all nonfuel minerals decreased 19% owing to lower average gold prices and a 17% decrease in gold output from Wharf Mine—South Dakota's only active major gold mine—compared with 2012. Other mineral commodities produced in the State included dimension stone, feldspar, gemstones, gypsum, industrial sand and gravel, lime, mica, and silver. The State remained the leading producer of mica in 2013 out of four producing States. Industrial sand and gravel was first produced in the State in 2012 (table 1).

[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All USGS mineral production data published in this chapter are those available as of February 2016. Data in this report are rounded to three significant digits and percentages are calculated from unrounded data. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at http://minerals.usgs.gov/minerals.

Commodity Review

Metals

Mineral industry activity with respect to metals was as follows:

Under a previous mining plan, the Wharf Mine had been expected to close in 2012 but in 2011 it received a permit from the State of South Dakota for an expansion. In 2012, the plan received an environmental assessment finding of no significant environmental impact from the U.S. Bureau of Land Management for the small portion of the expansion that would take place on Federal land, allowing the entire plan to proceed. Three new pits—Green Mountain, Golden Reward, and Portland Ridgeline—would be created between the existing Wharf Mine and part of the already reclaimed Golden Reward Mine, with the Golden Reward pit comprising portions of the reclaimed Harmony and Liberty pits from the former mine. The new pits were estimated to have an 8-year life extending to 2020. Work began on the 62-hectare Green Mountain Pit in 2012, from which it was estimated that 54.1 million metric tons (Mt) of overburden would be removed to obtain 12.7 Mt of ore. Mining in the Golden Reward Pit was not planned until 2014 and mining in the Portland Ridgeline Pit was planned until 2017 (South Dakota Department of Environment and Natural Resources, 2011). The ore grade at Wharf Mine averaged 0.65 grams per metric ton (g/t) (.019 troy ounces per short ton) in 2013 and 0.75 g/t (.022 troy ounces per short ton) in 2012 (Coeur Mining, Inc., 2015, p. 40).

The only other metal ore mined was iron ore, but it was no longer included in USGS iron ore statistics because its primary end use was as an iron source in the manufacture of cement clinker. South Dakota has one cement plant.

Industrial Minerals

Mineral industry activity with respect to industrial minerals was as follows:

While nationally about two thirds of industrial sand output was used as proppants for hydraulic fracturing by the oil and gas industry, it also had diverse end uses such as glassmaking, foundry sand, and recreational sand for such uses as golf course sand traps. A study by the South Dakota Geological Survey found that, in general, South Dakota's sand resources were not suitable for use in hydraulic fracturing (Marshall and others, 2014). However, one company in 2013 secured permits to mine industrial sand in Custer, Lawrence, and Pennington Counties that would meet specifications for proppant use (Hurlburt, 2013).

References Cited

Coeur Mining, Inc., 2015, Technical report for the Wharf operation prepared for Coeur Mining, Inc., Lead, South Dakota, U.S.: Coeur Mining NI 43-101 technical report, 301 p. (Accessed May 31, 2016, at http://www.coeur.com/docs/default-source/Technical-Reports/technical-report-issued-by-coeur-mining-inc-regarding-lead-south-dakota-u-s-on-august-4-2015.pdf).

Hurlburt, Adam, 2013, Potential silica sand mines could mean business for SD: Black Hills Pioneer [Spearfish, SD], March 19. (Accessed May 27, 2016, at http://www.bhpioneer.com/local_news/article_f46ecafa-90ad-11e2-9219-0019bb2963f4.html).

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South Dakota Department of Environment and Natural Resources, 2011, Summary document Wharf Resources (USA) Inc. mine permit application Wharf expansion project, 9 p. (Accessed May 31, 2016, at http://denr.sd.gov/des/mm/documents/WPASummaryDoc.pdf.)

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U.S. Mine Safety and Health Administration, [2014], Mine injury and worktime, quarterly, January–December 2013, Final, closeout edition, 34 p. (Accessed February 8, 2016, at http://arlweb.msha.gov/Stats/Part50/WQ/MasterFiles/MIWQ%20Master_20135.pdf.)

TABLE 1
NONFUEL MINERAL PRODUCTION IN SOUTH DAKOTA[1, 2]

(Thousand metric tons and thousand dollars)

Mineral	2011		2012		2013	
	Quantity	Value	Quantity	Value	Quantity	Value
Sand and gravel, construction	12,700	47,800	13,100	63,100	17,400	80,500
Stone, crushed	6,480 r	48,200 r	6,530	48,600	7,450	57,800
Combined values of cement (portland), clays (common), feldspar, gemstones (natural), gold, gypsum (crude), iron ore usable shipped (2011)],[3] lime, mica (crude), sand and gravel [industrial (2012–13)], silver, stone (dimension)	XX	215,000	XX	230,000	XX	187,000
Total	XX	311,000 r	XX	342,000	XX	325,000

rRevised. XX Not applicable.
[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Data are rounded to no more than three significant digits; may not add to totals shown.
[3]Discontinued because South Dakota is not a steel producer.

TABLE 2
SOUTH DAKOTA: CRUSHED STONE SOLD OR USED IN THE UNITED STATES, BY TYPE[1]

Type	2012				2013			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone[2]	9	2,840	$18,800	$6.61	8	3,110	$20,600	$6.63
Granite	1	121	1,730	14.29	1	106	698	6.61
Sandstone and quartzite[3]	3	3,030	22,700	7.49	3	3,200	25,000	7.80
Slate	1	12	93	7.72	1	12	96	7.75
Miscellaneous stone	2	524	5,290	10.11	2	1,030	11,400	11.09
Total or average	XX	6,530	48,600	7.44	XX	7,450	57,800	7.75

XX Not applicable.
[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
[2]Includes limestone-dolomite reported with no distinction between the two kinds of stone.
[3]Includes sandstone-quartzite reported with no distinction between the two kinds of stone.

TABLE 3
SOUTH DAKOTA: CRUSHED STONE SOLD OR USED BY PRODUCERS BY USE[1]

Use	2012			2013		
	Quantity (thousand metric tons)	Value (thousands)	Unit value	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:						
Coarse aggregate (+1½ inch):						
Riprap and jetty stone	--	--	--	W	W	W
Unspecified coarse aggregate	W	W	W	W	W	W
Coarse aggregate, graded:						
Bituminous surface-treatment aggregate	--	--	--	372	$5,000	$13.44
Unspecified graded coarse aggregate	--	--	--	W	W	W
Fine aggregate (-⅜ inch):						
Unspecified fine aggregate	W	W	W	W	W	W
Coarse and fine aggregates:						
Graded road base or subbase	--	--	--	224	1,690	7.56
Unspecified coarse and fine aggregates	W	W	W	459	5,220	11.35
Chemical and metallurgical:						
Cement manufacture	648	$1,880	$2.90	--	--	--
Other miscellaneous uses and specified uses not listed						
Unspecified:[2]						
Reported	2,130	16,200	7.60	2,440	17,900	7.36
Estimated	3,310	25,700	7.75	2,960	19,500	6.58
Total or average	6,530	48,600	7.44	7,450	57,800	7.75

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.
[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
[2]Reported and estimated production without a breakdown by end use.

TABLE 4
SOUTH DAKOTA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2012, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch)[2]	W	W	--	--	--	--
Coarse aggregate, graded	--	--	--	--	--	--
Fine aggregate (-⅜ inch)[3]	W	W	--	--	--	--
Coarse and fine aggregates[4]	W	W	--	--	--	--
Other construction materials	--	--	--	--	--	--
Agricultural	--	--	--	--	--	--
Chemical and metallurgical[5]	648	1,880	--	--	--	--
Special	--	--	--	--	--	--
Other miscellaneous uses and specified uses not listed	--	--	--	--	--	--
Unspecified:[6]						
Reported	568	4,140	--	--	--	--
Estimated	1,730	13,300	--	--	558	4,300
Total	2,960	19,500	--	--	558	4,300

Use	District 4	
	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch)[2]	--	--
Coarse aggregate, graded	--	--
Fine aggregate (-⅜ inch)[3]	--	--
Coarse and fine aggregates[4]	412	4,680
Other construction materials	--	--
Agricultural	--	--
Chemical and metallurgical[5]	--	--
Special	--	--
Other miscellaneous uses and specified uses not listed	--	--
Unspecified:[6]		
Reported	1,560	12,100
Estimated	1,030	8,070
Total	3,010	24,800

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes unspecified coarse aggregate.
[3]Includes unspecified fine aggregate.
[4]Includes terrazzo and exposed aggregate and unspecified coarse and fine aggregates.
[5]Includes cement manufacture.
[6]Reported and estimated production without a breakdown by end use.

TABLE 5
SOUTH DAKOTA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2013, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch)[2]	W	W	--	--	--	--
Coarse aggregate, graded[3]	W	W	--	--	--	--
Fine aggregate (-⅜ inch)[4]	--	--	--	--	--	--
Coarse and fine aggregates[5]	W	W	--	--	--	--
Other construction materials	--	--	--	--	--	--
Agricultural	--	--	--	--	--	--
Chemical and metallurgical	--	--	--	--	--	--
Special	--	--	--	--	--	--
Other miscellaneous uses and specified uses not listed	--	--	--	--	--	--
Unspecified:[6]						
Reported	740	5,300	--	--	--	--
Estimated	2,450	15,500	--	--	509	3,950
Total	3,220	21,300	--	--	509	3,950

Use	District 4		Unspecified districts	
	Quantity	Value	Quantity	Value
Construction:				
Coarse aggregate (+1½ inch)[2]	W	W	--	--
Coarse aggregate, graded[3]	W	W	372	5,000
Fine aggregate (-⅜ inch)[4]	W	W	--	--
Coarse and fine aggregates[5]	W	W	91	600
Other construction materials	--	--	--	--
Agricultural	--	--	--	--
Chemical and metallurgical	--	--	--	--
Special	--	--	--	--
Other miscellaneous uses and specified uses not listed	--	--	--	--
Unspecified:[6]				
Reported	1,700	12,600	--	--
Estimated	--	--	--	--
Total	3,260	26,900	463	5,600

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes unspecified coarse aggregate.

[3]Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and unspecified graded coarse aggregate.

[4]Includes unspecified fine aggregate.

[5]Includes terrazzo and exposed aggregate and unspecified coarse and fine aggregates.

[6]Reported and estimated production without a breakdown by end use.

TABLE 6
SOUTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2012,
BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)[2]	1,240	$6,690	$5.41
Asphaltic concrete aggregates and other bituminous mixtures	259	1,230	4.75
Road base and coverings	3,670	17,200	4.69
Fill	232	749	3.23
Snow and ice control	43	197	4.58
Other miscellaneous uses[3]	36	363	10.08
Unspecified:[4]			
Reported	1,410	7,000	4.97
Estimated	6,220	29,600	4.76
Total or average	13,100	63,100	4.81

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
[2]Includes plaster and gunite sands.
[3]Includes filtration and railroad ballast.
[4]Reported and estimated production without a breakdown by end use.

TABLE 7
SOUTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2013,
BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	426	$2,360	$5.55
Asphaltic concrete aggregates and other bituminous mixtures	126	289	2.29
Road base and coverings	5,300	20,000	3.79
Fill	270	1,190	4.40
Snow and ice control	11	55	5.00
Filtration	9	80	8.89
Unspecified:[2]			
Reported	1,020	4,990	4.89
Estimated	10,300	51,500	5.02
Total or average	17,400	80,500	4.62

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
[2]Reported and estimated production without a breakdown by end use.

TABLE 8
SOUTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2012,
BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)[2]	W	W	W	W	15	110
Asphaltic concrete aggregates and road base materials	W	W	W	W	818	3,840
Fill	28	146	23	36	122	428
Other miscellaneous uses[3]	42	194	19	173	7	68
Unspecified:[4]						
Reported	260	1,250	27	377	79	378
Estimated	1,410	6,740	1,180	5,670	1,720	8,220
Total	2,560	12,700	2,180	10,100	2,760	13,000

Use	District 4		Unspecified districts	
	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)[2]	W	W	--	--
Asphaltic concrete aggregates and road base materials	W	W	237	1,160
Fill	59	139	--	--
Other miscellaneous uses[3]	10	125	--	--
Unspecified:[4]				
Reported	1,040	5,000	--	--
Estimated	1,920	8,980	--	--
Total	5,390	26,000	237	1,160

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes plaster and gunite sands.
[3]Includes filtration, railroad ballast, and snow and ice control.
[4]Reported and estimated production without a breakdown by end use.

TABLE 9
SOUTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2013,
BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate (including concrete sand)	82	508	W	W	W	W
Asphaltic concrete aggregates and other bituminous mixture	--	--	W	W	W	W
Road base and coverings	2,190	8,580	586	2,710	157	828
Fill	116	696	8	23	85	289
Snow and ice control	10	50	--	--	1	4
Filtration	--	--	--	--	9	80
Unspecified:[2]						
Reported	226	1,090	30	178	68	338
Estimated	5,470	27,300	861	4,100	1,710	8,640
Total	8,100	38,200	1,690	8,060	2,030	10,300

	District 4 and unspecified districts	
	Quantity	Value
Concrete aggregate (including concrete sand)	W	W
Asphaltic concrete aggregates and other bituminous mixture	W	W
Road base and coverings	2,360	7,930
Fill	60	181
Snow and ice control	--	--
Filtration	--	--
Unspecified:[2]		
Reported	695	3,380
Estimated	2,230	11,500
Total	5,600	24,000

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Reported and estimated production without a breakdown by end use.